

US EPA ARCHIVE DOCUMENT

EPA Region 5 Greener Cleanup (GC) Workshop
Lake Michigan Room- 12th Floor — 77 West Jackson Blvd
Chicago, IL
February 9, 2010

Welcome and Introduction

Rick Karl, Director of the Superfund Division of U.S. Environmental Protection Agency (EPA) Region 5, welcomed participants. He opened by saying that greener cleanup (GC) is an important step forward and that EPA Region 5 has been working to get the right people into place to start moving forward. EPA Region 5 has developed an interim policy that it hopes to expand on and use to lead by example. He outlined three focus points for the future:

- Continue to coordinate with states and EPA headquarters to develop the best techniques and policies
- Create better metrics and methods of data collection
- Find a way to market greener remediation – get attention

Jon Peterson, EPA Brownfields Project Officer/Manager outlined the agenda. Syed Quadri, EPA Superfund Remedial Project Manager, discussed how today's culture is mainstreaming the "going green" concept and presented several initiatives already started by state, local, non-governmental organizations, businesses, international organizations, and communities. He challenged project managers and coordinators to look for environmental opportunities using a systems approach and to identify and balance tradeoffs.

Greener Cleanup Basics and Acronyms

Gary Victorine, EPA Resource Conservation and Recovery Act (RCRA) Land Reuse Coordinator for the Land and Chemicals Division, and Brad Bradley, EPA GC Coordinator for the Superfund Division, discussed the basics of GC and pertinent acronyms. The term they prefer to use to represent this environmental concept is "greener cleanups." The definition of GC provided in an EPA Green Remediation Primer (2008, <http://www.clu-in.org/download/remed/Green-Remediation-Primer.pdf>), is "*The Practice of considering all environmental effects of remedy implementation and incorporating options that maximize the net environmental benefit of the cleanup.*" Mr. Victorine and Mr. Bradley avoid using the word "sustainability" at this time because it represents a broader focus on the triple bottom line (environmental impacts, economic viability, and societal impacts), rather than a singular focus on environmental impacts. Mr. Victorine explained that GC can be applied during site investigation, remedy decision-making, and remedy optimization. He said that EPA is making GC a priority and has demonstrated this by integrating GC into five goals found in the 2006 to 2011 EPA Strategic Plan.

Mr. Victorine presented two good sources of information for GC: (1) EPA's Green Remediation Primer (2008) and (2) the Office of Solid Waste and Emergency Response (OSWER) – Principles for Greener Cleanup. Mr. Victorine closed his discussion by introducing the five principles presented in OSWER's Principles of Greener Cleanup:

1. Minimize total energy use and maximize the use of renewable energy.
2. Minimize air pollutants and greenhouse gas (GHG) emissions.
3. Minimize water use and impact to water resources.
4. Reduce, reuse, and recycle material and waste.
5. Protect land and ecosystems.

(The OSWER Principles for Greener Cleanup and other information are available at:
<http://www.epa.gov/oswer/greencleanups/>.)

National and Regional Greener Cleanup Summary

Mr. Victorine and Mr. Bradley presented a national summary of the U.S. EPA's greener cleanup activities. Included in their presentation were the tools, strategies, policies and activities used by EPA Regions. Tools and available information presented include the following:

- EPA Green Remediation Primer (<http://www.clu-in.org/download/remed/Green-Remediation-Primer.pdf>)
- Best Management Practices (BMP) for GC (www.clu-in.org/greenremediation/)
- CLU-IN Green Remediation Focus Web site (www.clu-in.org/greenremediation/)
- EPA OSWER Technical Support Project – Engineering Forum (including, Engineering Forum Paper: *Introduction to Energy Conservation and Production at Waste Cleanup Sites*, <http://www.epa.gov/tio/tsp/download/epa542s04001.pdf>)
- OSWER – Principles of Greener Cleanups (<http://www.epa.gov/oswer/greencleanups/principles.html>)

Mr. Victorine also identified the following OSWER workgroups:

- Green Remediation, Reuse, and Redevelopment Team (GRRR)
- National GCs Metrics Workgroup
- RCRA Reuse and Brownfields Prevention Workgroup
- Superfund National Green Remediation Workgroup

Mr. Victorine also discussed the EPA National Clean Diesel Campaign (NCDC), which works to improve air quality by reducing diesel emissions. More information on NCDC can be found on EPA's website.

Mr. Victorine presented information regarding U.S. EPA Regional efforts related to GC. Region 3 has been working on national standards for GCs and will be hosting a GC symposium in the near future (originally scheduled for February 10-11, 2010, but postponed due to weather). Region 9 has started site-specific pilots using life cycle analysis of GC alternatives, and also developed the *Smart Energy Resources Guide* in 2008 for project managers; this resource guide aids in choosing cleaner diesel construction equipment and retrofit technologies. Region 5 has developed a GC interim policy, started training its staff, and initiated pilot studies with a GC focus. Information on Region 5 efforts can be accessed at:
<http://www.epa.gov/reg5rcra/wptdiv/cars/remediation/>.

Mr. Bradley presented the status of EPA's Superfund Green Remediation Strategy. A workgroup composed of headquarters and Regional staff is finalizing the Superfund Green Remediation Strategy, which will promote green remediation practices during cleanups without compromising cleanup goals. The strategy includes 10 key action items:

1. Clarify the role of green remediation in remedy selection, and recommend potential statutory and regulatory changes.
2. Develop a compendium of practices and tools to help project and program managers integrate green remediation practices.
3. Develop program incentives to encourage use of green remediation practices.
4. Address air pollutants and diesel emissions.
5. Develop pilot projects to evaluate and demonstrate green remediation applications.

6. Establish incentives to encourage contractors, assistance agreement recipients, and others to use green remediation practices.
7. Communicate and share success stories and lessons learned among “implementers” across programs and with the public.
8. Evaluate green remediation application at the site level.
9. Develop program evaluation measures.
10. Evaluate the Superfund Green Remediation Strategy.

Mr. Bradley stressed the importance of quantifying the advantages of GCs. It is important to develop baselines, measurements, and metrics to determine the results of applying GC techniques. He also stated the importance of existing cross-program efforts and workgroups and the benefits of continued collaboration with these groups, regions, and other organizations. In this way, all groups will be abreast of the data and technology available to support GC efforts.

State Summaries

Illinois - Gary King, Acting Chief, Bureau of Land, Illinois EPA, presented the status of Illinois GC efforts. He said that Illinois (1) has developed a matrix that supports a qualitative evaluation of GCs, (2) is active in the task group developing the American Society for Testing and Materials (ASTM) Standard Guide for Green and Sustainable Site Assessment and Cleanup, (3) is working on a RCRA pilot study with EPA Region 9, and (4) has developed five guiding principles for GCs. The five guiding principles and other information on Illinois GC efforts (including the matrix tool) are available at: www.epa.state.il.us/land/greener-cleanups.

Mr. King identified a few of the challenges facing implementation of GCs, including:

- How do we apply big-picture thinking to small sites?
- How do we overcome the perception that conventional practices are easier, faster, cheaper, and more effective?
- Are we competing for attention with another emerging science? He mentioned that a vapor intrusion rulemaking is currently underway in Illinois.
- How do we persuade site owners and consultants to incur learning curve costs when this a voluntary initiative?
- What impact will GC efforts have on project-manager workload?

Wisconsin - Annette Weissbach from the Wisconsin Department of Natural Resources (WDNR) talked about Wisconsin's Initiative for Sustainable Cleanups (WISC). Ms. Weissbach shared the WISC guiding principle, *“Sustainability should be considered in remedy selection and implementation, but must not compromise environmental protection,”* with the participants. WISC has been developing a guidance document focusing on (1) meaningful sustainability performance metrics, (2) easy to use and implement remedial activities, and (3) pathways for greener optimization of existing systems. Currently the guidance is in draft form. When it is finalized, it will be a live document. WDNR is implementing sustainable remediation at select state-lead sites to monitor its effectiveness. WDNR plans to (1) provide training and guidance on sustainable remediation across its programs, (2) collect feedback from internal and external stakeholders, (3) revise the guidance document (as necessary), and (4) develop a formal recognition program, which is key for encouraging GC by Responsible Parties and Voluntary Parties. WDNR is currently evaluating the following suggestions:

- Regulatory innovation to encourage implementing sustainable remediation
- Pilot Green Tier/EMS programs within WDNR
- A “LEED”-like system for WISC cleanups

- Other types of incentives to promote GCs
- Potential need for rule changes

A participant asked Ms. Weissbach how WDNR is applying the social aspect to what it is doing. Ms. Weissbach responded that while WDNR is not directly addressing the social aspect, she believes that removing eyesores from neighborhoods through Brownfield projects will cause the community to respond positively; therefore, the social aspect will follow.

Minnesota - Rebecca Bourdon from the Minnesota Pollution Control Agency (MPCA) presented Minnesota's Green Sustainable Remediation and Redevelopment (GSR²) initiative. The Greener Remediation Initiative Team (GRIT) was organized in 2009 and focused on the core elements of GC to compare the impacts of GCs and the challenges of implementing GC ideas. GSR² plans on using core elements to reduce impacts and is being creative in regards to how GC goals are achieved. Ms. Bourdon described how MPCA coordinated with vendors and contractors to see if they are already incorporating GC practices and to document what they are doing. Some GC activities already being practiced were vehicle miles traveled reductions, electronic reporting and invoicing, Ultra Low Sulfur Diesel (ULSD) use, anti-idling practices, and corporate green practices such as using Energy Star products. GSR² plans on increasing its focus on site-specific practices, incorporating annual corporate practices reporting, and extending efforts beyond the petroleum program.

Michigan - Darlene Van Dale, a Brownfield Redevelopment Specialist for the Michigan Department of Natural Resources and Environment (MDNRE), reported that Michigan is behind some of the other states in developing GC practices. Michigan just recently received approval to establish a GC workgroup, which will have its first brainstorming session on February 10, 2010. The workgroup will make recommendations for a state policy, evaluate how Michigan can incorporate the EPA policy into state policies, identify GC practices for all programs, consider what practices the state can make mandatory versus voluntary, and implement practices in state programs that will set an example for voluntary programs.

Indiana - Bob Moran from the Indiana Department of Environmental Management (IDEM) reported that Indiana is just becoming aware of GC practices. IDEM has been participating with EPA in GC meetings and held an informal meeting for staff explaining what greener remediation is. IDEM currently is participating with the Midwest Clean Diesel Initiative (MCDI). Through MCDI, IDEM is working with school, municipal, and public entities and the private sector, to retrofit diesel vehicles with diesel oxidation catalysts, aftermarket auxiliary heaters, and auxiliary power units that dramatically reduce harmful tailpipe emissions. IDEM plans to raise project manager awareness of GC and to encourage GC at their sites.

Ohio - Martin Smith and Lynn Ackerson from Ohio EPA reported that Ohio has not done much formally with greener remediation. Ohio's enforcement program is currently waiting for guidance from EPA. However, Ohio EPA is trying to share information on greener remediation with participants in the state's Voluntary Action Programs. The State's Voluntary Cleanup Grant scoring system already contains questions related to Leadership in Energy and Efficient Design (LEED) principles. The Division of Hazardous Waste Management is working on a draft sustainability strategy and while this is in development, the agency is sharing information on GCs through boilerplate letters.

State of Green Cleanup Standard

Deb Goldblum from EPA Region 3 reported on the status of the Green Cleanup Standards Workgroup. Ms. Goldblum reported the following key workgroup accomplishments:

- Identified green cleanup core elements, which were incorporated into OSWER's Greener Cleanup Principles;
- Agreed to collaborate with ASTM International to develop a standard; and

- Facilitated dialogue among EPA and state regulators contributing to the standard's development.

The workgroup faces many challenges, including the following: (1) accommodating various regulatory structures and technical issues, (2) keeping the standard pragmatic, (3) defining boundaries, and (4) preventing "green washing." The workgroup plans to meet in April 2010 to compile and discuss the draft standard.

Region 5 GC Policy and Feedback

Gary Victorine and Brad Bradley presented key elements for Region 5's GC Interim Policy. (See: <http://www.epa.gov/reg5rcra/wptdiv/cars/remediation/>). After presenting the key elements, Mr. Victorine and Mr. Bradley asked for any feedback from the participants.

Question from participant: Why was a numerical target of 50 percent of uncontaminated construction and demolition (C&D) material used and no other numerical values used?

Answer from presenters: Because a robust C&D program already exists at Region 5; EPA felt more comfortable putting a hard number for C&D compared to other areas.

Amplification from EPA's Julie Gevernov: In addition, the 50 percent goal shows up in LEED and other documents, including an Executive Order for federal agencies. If a number is used, it forces people to keep good records.

Comment from Michigan participant: People are already doing a good job of tracking their waste and recommends increasing the target to 75 percent of waste volume.

Question from participant: Why are biofuels not specifically mentioned?

Answer from presenters: It was not a lack of endorsement. It just was not included as recommended wording for the policies. They will consider the suggestion to include this area.

Two questions from Ann Kolata of South Bend, Indiana: (1) What is Water Sense? and (2) What is "green washing"?

Answer from presenters: It is a certification program for manufacturers to use less water or as little water as is feasible. "Green washing" is saying something is green when it is not.

Question from Participant from Michigan: Are noise and lights as potential problems going to be included in the policy?

Answer from presenters: Noise and lights are not currently in the policy. The intent of the policy was to focus on environmental aspects.

Question from Gary King, Illinois EPA: Use of other waste products in beneficial ways seems to fit within state authorities. What are you doing to encourage states to use their authorities?

Answer from presenters: As we are just getting started, we are in an information-sharing and awareness-raising stage right now.

Question from Nick Petruzzi, of Cox & Calvin: When you are determining which option is the best alternative, are all criteria weighted equally?

Answer from presenters: The criteria are supposed to be weighted equally. There may be certain sites where one criterion is more important than others. However, within the five core principles, no one has indicated that they should be weighted differently.

Question from TaNaisha Lee, Region 5: Can you give an example of high methane recovery in the region? Have you looked into reducing methane production with cap materials?

Answer from presenters: The presenters were not aware of any specific efforts. They indicated they will follow up on this item and get back to the participant.

Comment from Participant in Michigan: In some cases, landfills are lowering caps to get less methane and leachate.

Comment from Rebecca Bourdon, MPCA: The East Bethel Closed Landfill in Minnesota provides a good example of methane recovery and of the use of native grasses/vegetation. This landfill was closed in concert with community input and includes an area for the reintroduction of the sand crane.

Comment from Annette Weissbach, WDNR: You can encourage use of a certified C&D recycler, (e.g., WASTECAP).

Comment from Tim Killeen from Ohio Department of Transportation: To avoid setting artificial goals at this time, why not just encourage the growth of green technologies? This could be accomplished by developing a checklist of usable or current green technologies. He said that you could avoid the negative items accounted for in Ms. Goldblum's presentation. Over time, you could gather information and evaluate the results to determine what is effective and encourage new technologies that have been developed or applied on each project.

Case Studies – Round 1

LUST Sites - Hernando Albarracin, manager of the Leaking Underground Storage Tank (LUST) Section, Illinois EPA, discussed applying green remediation principles to LUST sites. Mr. Albarracin pointed out that LUST sites are an excellent place to apply GC because LUST sites comprise a large universe of similar sites where a single green remediation model can be applied. He shared several ideas for greener remediation and listed some of the greener approaches Illinois EPA already is applying across the investigative and cleanup process. He also noted that a GC workgroup was created with four objectives: (1) to evaluate the usefulness of the matrix when applied to specific sites; (2) to locate tank owners and operators receptive to GCs; (3) to cultivate pilot projects; and (4) to develop a recognition program for tank owners and operators and environmental consultants that implement GCs.

Mr. Albarracin shared information on a pilot study being implemented in coordination with British Petroleum (BP). At three service stations, a sulfate solution was applied to treat groundwater contamination in situ. The results indicate that this approach has increased the degradation rate of benzene.

To move forward, the LUST section is planning to take advantage of the best management practices (BMPs) developed by EPA for site investigation and remedial technologies, to participate in more pilot studies, and to develop criteria for a prototype green remediation model that can be applied across LUST sites.

Integrated GC Evaluating into Remedy Selection - Rebecca Bourdon of MPCA presented a case study for a site located near Owatonna, Minnesota. The site was a former unregulated used-oil reclamation site. Ms. Bourdon described the corrective action process that was applied for surface soil contamination. The site team performed a risk comparison of the exposure risks associated with an on-site solution versus an on- and off-site solution and applied a qualitative evaluation approach. The area of impact was not currently being used and there was a low likelihood that it would be used in the future. The area was already stabilized with heavy vegetation and natural attenuation and phytoremediation was already occurring. If a dig and haul alternative was implemented, it would have the following impacts: (1) heavy equipment emissions; (2) emissions, waste and costs associated with sample collection and shipping; (3) the cost of disposal equipment and dust emissions; (4) the cost of clean fill excavation and hauling emissions; (5) the cost of regulatory oversight; and (6) vegetative cover disturbance and re-establishment. After evaluation, the site team determined to leave the contamination on site; this brought up the argument that GC results in "do nothing" decisions, although the on-site approach did still include verification sampling and social impact considerations.

Ms. Bourdon's presentation led to questions and comments from workshop participants, as summarized below.

Question from Lisa Hamilton: Regarding this presentation, it appears that worker exposure was not included in the on- and off-site scenario, although this is implied when talking about the transportation component. Why is worker exposure not included outright as part of the on- and off-site exposure scenario?

Answer from presenter: Worker safety does not fall into consideration for remedy selections for corrective action work. The Occupational Safety and Health Act (OSHA) regulates worker safety.

Question from Chris of Chevron: Has anyone done a quantitative analysis, in which actual numbers are recorded and comparisons made?

Answer from presenter: Quantitative analysis is the next step. There are different tools available to do this, but the state has not had the time to determine which tools to adopt. Currently, time and resources are limited, but the state would like to get to that level of analysis.

Question from EPA Region 5 staff: Does the "do nothing" approach include institutional controls limiting the use of site?

Answer from presenter: Actually, phytoremediation is not a "do nothing" approach. The site team did consider all factors when deciding not to implement the other alternative. If the risk scenario had called for corrective action to address human health and environmental risks, it would have been implemented. However, the existing site conditions and risk assessment did not indicate an unacceptable level of risk for human health or the environment; therefore, the phytoremediation approach also was determined to be protective. In evaluating all criteria (including human health and environmental protection), phytoremediation met all of the criteria and was identified as the best option at this site.

Question from Beth Grigsby, ATC: Have options for potential future reuse of the site been considered?

Answer from presenter: Currently, there is only one adult on the site and the site team has been working with this individual to discuss potential reuse options.

Other Organizations and GCs

Ms. Bourdon reported on the status of the Interstate Technology and Regulatory Council (ITRC). ITRC is producing an overview document as a general technical document for GC (rather than a standards-focused document such as the one that ASTM is producing). ITRC anticipates publication of its overview document in April 2010.

Heather Nifong of the Illinois EPA presented on the status of the greener remediation efforts of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO). ASTSWMO's Greener Cleanups Task Force (GTCF) has four main goals, including: (1) identify best practices and incentives for GCs; (2) support state programs in their efforts to integrate these approaches into state remedy selection and implementation processes; (3) strengthen partnerships between the states and EPA to increase GC capacities; and (4) operate as a technical resource for other ASTSWMO task forces and subcommittees. ASTSWMO's GTCF has written four strategic papers which serve as good sources of information on GC. More information can be found on the ASTSWMO website at:

http://astswmo.org/resources_sustainability_greenercleanups.html. Ms. Nifong also informed the participants that the Sustainable Remediation Forum (SURF) has produced an exhaustive white paper on GC (<http://www.sustainableremediation.org/library/issue-papers/>).

Jon Peterson of EPA then shared information about brownfield projects and the National Association of Local Government Environmental Professionals (NALGEP). Mr. Peterson informed the group that brownfields and LUST sites provide the largest universe of cleanup sites. Brownfield grants are very competitive and one of the evaluation criteria is sustainable outcomes. Mr. Peterson shared several examples

of GC activities at ongoing and redeveloped brownfields sites. He also explained that NALGEP is an organization with over 1,200 members. NALGEP provides peer-to-peer learning opportunities, training and technical assistance, and information on environmental policies, tools, and information. Additional information on NALGEP is available on the following web site: <http://www.nalgep.org/>.

Case Studies—Round 2

Windmill Driven Pumping - Nivas Vijay from Quality Environmental Professionals, Inc. (QEP) presented a case study on the South Bend, Indiana, Hannover Property. Remedial action at the site recommended the use of high-vacuum Multi-Phase Extraction (MPE) supplemented with pump-and-treat to recover light non-aqueous phase liquids (LNAPLs) and remediate impacts to soil and groundwater. After researching various environmentally efficient options for the selected remedial technology, QEP determined that the two pump-and-treat wells would be installed with windmill-operated down-well recovery pumps; these two wells would then be tied into the larger remediation system. Windmill pumps help ease electric requirements and are less expensive to maintain in the long term, helping to justify initial expenses. Local vendors were used to produce the windmills. QEP hopes to have data later in the year to quantify electrical cost savings. Mr. Vijay's presentation raised a few questions, as summarized below:

Question from Nick Petruzzi of Cox & Calvin: Were a number of windmill vendors available?

Answer from presenter: QEP identified only one vendor in the area through a Google search.

Question from Nick Petruzzi of Cox & Calvin: What was the pump rate?

Answer from presenter: In the pilot test, a 20-foot-tall and seven-foot-wide windmill provided a pumping rate of three gallons per minute.

Question from J. Pruis through the webinar: Could you describe the mechanical linkage between the Amish wind turbines and the pumps to be used?

Answer from presenter: The presenter indicated this information could not be provided at this time.

Question from M. Turner through the webinar: Was a wind study completed for the site to determine the approximate operational time of the windmill?

Answer from presenter: No wind study was conducted.

Remedy Optimization Using Sustainable Metrics - Greg Brooks of AECOM presented a case study for the N.W. Mauthe Site, a WISC site. The site specific WISC process included the following steps: (1) developing a carbon footprint of current remediation (including determining the environmental, economic and social sustainability metrics to be used at the site and calculating the baseline for these metrics); (2) examining the remediation system to determine the potential for optimizing the performance or sustainability of the remedy; (3) examining the potential for applying alternative energy from renewable resources; and (4) developing a menu of potential sustainable alternatives that can be implemented and presenting the alternatives in a matrix that outlines the costs and benefits of each alternative in the terms of the sustainability metrics. Groundwater extraction trenches at the site discharged into an on-site treatment system that operated onsite until 2006; at that time, approval was granted to discharge the extracted water directly to the sanitary system. There is currently a treatment building remaining on the site to provide the connection to the sanitary system. An examination showed that the site's carbon footprint was small, with the largest portion of the footprint generated by heating the treatment building. An optimization study was done and four possible solutions were identified, including either replacing the treatment building with a smaller enclosure or finding a useful purpose for the building. It was predicted that remedy optimization could decrease the life cycle carbon dioxide emissions of the site by 97 percent.

GC Options Implemented at BP Sites in Indiana and Illinois - Dennis Kasner from URS Corporation (URS) presented a case study addressing the City of Laporte, Indiana, and BP sites in Wood River, Illinois, and

Whiting, Indiana. The City of Laporte did not have the money to construct a cover for an existing landfill; therefore, URS used an alternative landfill cap that reused existing site materials. URS worked with the Indiana Brownfield Programs to demonstrate that the alternative cover provided equivalent protection to other materials that could be used. Some of the GC practices presented at the BP Wood River site include: storing non-impacted groundwater and reusing it for fire suppression, (2) using microturbines to power the groundwater pumping systems, (3) developing a master plan for site reuse, and (4) recycling demolition materials. At the BP Site in Whiting, Indiana, solar-powered mobile groundwater pumping systems were used for remote areas of the site.

Open Discussion – Feedback and Next Steps – How Can Region 5 and the States Facilitate GC?

Gary Victorine and Brad Bradley closed the workshop by discussing Region 5's plans for the future and opening the floor for comments and questions.

They shared that EPA Region 5 intends to:

- continue its emphasis on pilot studies in order to gain more data;
- work with EPA and state green cleanup groups;
- coordinate with EPA headquarters and other regional coordinators;
- get input from workshops that EPA Region 5 sponsors or attends; and
- develop a strategy that will move the GC Interim Policy to implementation.

Comments and questions during the open discussion are summarized below:

Participant comment: Individual states need to recognize what already is going on in their states, recognize what is going on within their own boundaries and use ongoing efforts to support future developments.

Response by presenters: Mr. Bradley acknowledged that understanding and building on ongoing efforts are important to support GC progress.

Question from Pam Barnett: How do you see this initiative being communicated to project managers within the cleanup agencies?

Answer from presenters: The GC Interim Policy is a signed policy, so if a project manager is implementing measures that are counter to the policy, he will need to justify why. The project managers will need to be educated so that they can implement the policy and GC concepts at their sites.

Comment from Ann Kolata, South Bend IN: You need to establish some cooperative agreements with the states and initiate cross-program initiatives. Get cooperation from the top of the agencies and then this will filter down.

Response from presenters: The presenters acknowledged that they have received training and support from their managers for GC efforts. They also acknowledged that there will need to be communication across divisions at the Division Chief level. The presenters indicated that their Director is planning to put letters of support on the street and provide some training. Workshops like this one will help other states gain incentives and information for future efforts.

Question from Rosemary Spalding: Site investigation plans, corrective action plans, and remediation work plans are prepared by consultants. What kinds of training opportunities are available to them?

Answer from presenters: The presenters indicated that EPA is still training internal staff at this point. As they learn more about GCs, they would like to be a part of the solution. For example, workshops like this one provide networking opportunities and allow participants to become aware of the different roles and efforts of other agencies. Region 5 does not currently have any formal training in process.

Participant comment: ITRC generally provides training when it finishes a new document. This may be anticipated when ITRC's GC overview document is published in April 2010.

Question from Tim Killeen: Most case studies cover successful remediation activities. Could you encourage people to document unsuccessful case studies so that others can learn about some of the site conditions that inhibit success?

Answer from presenters: The presenters encouraged the documentation of lessons learned, as well as successes, so that EPA can share this information. They requested and encouraged participants to send in short summaries on GC efforts and findings.

Question from Marcus Martin: Are there case studies of greener remediation that were implemented on small (less than one acre) urban brownfield sites?

Response from David Tsao of BP: There are pocket parks in the City of Chicago.

Response from presenter: Mr. Bradley added that urban gardens have been implemented on small plots.

Question from Scott Mounts: The beauty of this topic is that it promotes innovation and flexibility by the user. What are you doing to avoid the slippery slope of regulatory guidance that ends up establishing command-and-control policies?

Answer from presenters: To this point, the establishment of command-and-control policies does not seem likely. EPA has changed a lot in the past 15 years and is more collaborative. For GCs, there is a good incentive to collaborate. EPA is encouraging project managers and others to try GC and will share successes. To date, the emphasis is on pilot studies that can provide hard data. This would assist in providing information that can address questions such as “when will I get my money back for a GC effort?” EPA still has not gotten a complete handle on life cycle analysis for GCs, but knows that green approaches are the future and what EPA needs to focus on.

Question from participant: When looking at a site, what happens if you realize it will use more energy to remediate than it is worth? Should such a consideration be more important?

Answer from presenters: The presenters indicated that the first determinant of whether a site will be remediated is the basic requirement for protection of human health and the environment. You must meet the threshold criterion, whether or not the remedy is energy efficient.

The presenters thanked everyone for their attendance and participation. This concluded the workshop.